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(54) OPTICAL DISC LOADING APPARATUS

LADEVORRICHTUNG FÜR OPTISCHE DATENTRÄGER

APPAREIL DE CHARGEMENT DE DISQUE OPTIQUE

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Description

TECHNICAL FIELD

[0001] The present invention relates to an optical disc player using a slot loading method, and in particular to an optical disc loading apparatus capable of loading different-sized optical discs with the small number of parts.

[0002] An optical disc loading apparatus according to the preamble of claim 1 is known from EP-A-1 087 387.

BACKGROUND ART

[0003] Generally, an optical disc loading apparatus is largely divided into a tray transfer type and a slot loading type. In the slot loading type, not by mounting a disc onto a tray and transferring to a disc driver, but by inserting a disc into a slot and transferring it, the disc can be played. Accordingly, in the slot loading type, it is difficult to coincide the disc with a center of a spindle motor in comparison with the tray transferring type.

[0004] In addition, there are an optical disc having a diameter of 12cm and an optical disc having a diameter of 8cm, and accordingly an optical disc reproducing apparatus has to be possible to load various sized-discs onto a spindle accurately.

[0005] In the conventional tray transferring type, a 12cm disc mounting portion and a 8cm disc mounting portion can be easily distinguished from each other by forming a stepped portion. However, in the slot loading type, it is difficult to distinguish a size of an inserted disc and load it.

[0006] In order to solve the above-mentioned problem, various optical disc loading apparatus have been developed, Japan patent application No.2000-227417 and Korea patent application No.2002-6312, etc. are related to them.

[0007] However, in the conventional optical disc loading apparatus, because a large quantity of parts are used in order to distinguish and load different-sized discs, lots of fabrication cost and fabrication time are consumed. In addition, operation reliability is lowered.

TECHNICAL GIST OF THE PRESENT INVENTION

[0008] In order to solve the above-described problems, it is an object of the present invention to provide an optical disc loading apparatus capable of reducing the number of parts by simplifying a structure, lowering a fabrication cost and loading a different-sized disc reliably.

[0009] In order to achieve the above-mentioned objects, an optical disc loading apparatus in accordance with the present invention includes a main roller installed at an inlet side of an optical disc drive in order to take in/out an optical disc; a disc guide installed in the opposite direction of the main roller with an inserted disc therebetween; a disc path control member installed between the main roller and the inlet side of the drive; a small disc stopping member formed at the drive in order to make an inserted small disc stop at a position mountable onto a spindle; and a large disc stopping member formed at the drive in order to make an inserted large disc stop at a position mountable onto a spindle; wherein the disc path control member is formed so that an inserted disc contacting to the main roller, the disc guide and the path control member simultaneously has a proceeding direction different from that of an inserted disc contacting to the main roller, the disc guide simultaneously; the small disc stopping member has a certain height in order to stop a disc proceeding while simultaneously contacting to the main roller and the disc guide, and in order not to stop a disc proceeding while simultaneously contacting to the main roller, the disc guide and the path control member; and the large disc stopping member has a certain height in order to lock a disc proceeding while simultaneously contacting to the main roller, the disc guide and the path control member, the apparatus further includes a roller frame, at which the main roller is hinge-joined at the end and the disc path control member is formed at the other end, rotationally hinge-joined with the main frame of the optical disc drive.

[0010] Accordingly, in the present invention, by having a structure capable of varying a proceeding path of a disc according to a kind of an inserted disc with the small-number of parts, it is possible to load a disc stably.

[0011] In addition, it is preferable for the disc path control member to have a sub roller installed at the end contacting to an inserted disc. Accordingly, an disc can be smoothly inserted without being scratched by the disc path control member.

[0012] And, the sub roller has a hyperboloid shape so as to contact only with the outer circumference of an optical disc, and accordingly it is possible to protect a data storing region of a disc from scratch.

[0013] The end of the roller frame at which the disc path control member is installed is bended in order to close the drive inlet when the main roller is separated from an inserted disc. In more detail, when the disc loading is finished and the roller frame is rotated so as to be separated from the inserted disc, the disc path control member closes the inlet of the disc drive, and accordingly it is possible to prevent duplicated disc insertion.

[0014] In addition, the disc path control member includes a cleaning means at a surface contacted to an inserted disc, and accordingly it is possible to remove impurities on a data storing region of the disc.

[0015] And, each contact rib has a different height in order to make an inserted optical disc be stopped completely in the small disc stopping member.

BRIEF DESCRIPTION OF DRAWINGS

[0016] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate a first embodiment representing the in-

vention and together with the description serve to explain the principles of the invention, and a second example for illustrative purposes and not representing the invention.

[0017] In the drawings:

Figures 1~13 show an optical disc loading apparatus in accordance with a first embodiment of the present invention;

Figure 1 is a plan view illustrating an optical disc loading apparatus in inserting of a small disc;

Figure 2 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position II in Figure 1;

Figure 3 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position III in Figure 1;

Figure 4 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position IV in Figure 1;

Figure 5 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position V in Figure 1;

Figure 6 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position VI in Figure 1;

Figure 7 is a plan view illustrating the optical disc loading apparatus when a large disc is inserted;

Figure 8 is a side view illustrating the optical disc leading apparatus when the inserted large disc is located at position VIII in Figure 7;

Figure 9 is a side view illustrating the optical disc loading apparatus when the inserted large disc is located at position IX in Figure 7;

Figure 10 is a side view illustrating the optical disc loading apparatus when the inserted large disc is located at position X in Figure 7;

Figure 11 is a side view illustrating the optical disc loading apparatus when the inserted large disc is located at position XI in Figure 7;

Figure 12 is a perspective view illustrating a disc guide;

Figure 13 is a sectional view taken along a line XIII-XIII in Figure 12;

Figure 14 is a front view illustrating a modified example of a sub roller in accordance with the first embodiment of the present invention;

Figure 15 is a side-sectional view illustrating a modified example of a disc path control member not representing the present invention;

Figure 16 is a plan view illustrating another example of a disc path control member not representing the present invention;

Figure 17 is a front view illustration another example of a disc path control member not representing the present invention;

Figures 18~29 show an optical disc loading apparatus in accordance with a second example not representing the invention;

Figure 18 is a plan view illustrating the optical disc loading apparatus in inserting of a large disc;

Figure 19 is a side view illustrating a large disc cam member in Figure 18;

Figure 20 is a side view illustrating a small disc cam member in Figure 18;

Figure 21 is a side view illustrating the optical disc loading apparatus in Figure 18 when a large disc cam locking protrusion in Figure 18 is located at a position IIX I;

Figure 22 is a side view illustrating the optical disc loading apparatus in Figure 18 when the large disc cam locking protrusion in Figure 19 is located at a position IIX II;

Figure 23 is a side view illustrating the optical disc loading apparatus in Figure 18 when the large disc cam locking protrusion in Figure 19 is located at a position IIX III;

Figure 24 is a plan view illustrating the optical disc loading apparatus in inserting of a small disc;

Figure 25 is a side view illustrating the optical disc loading apparatus in Figure 24 when the small disc cam locking protrusion in Figure 20 is located at a position IIX V;

Figure 26 is a side view illustrating the optical disc loading apparatus when the small disc in Figure 24 contacts to a trigger protrusion;

Figure 27 is a side view illustrating the optical disc loading apparatus in Figure 24 when the small disc cam locking protrusion in Figure 20 is located at a position IIX VII;

Figure 28 is a perspective view illustrating a disc guide in Figure 21;

Figure 29 is a sectional view taken along a line IIX IX - II X IX;

Figure 30 is a front view illustrating a modified example of a sub roller in accordance with the second example; and

Figure 31 is a conceptual view illustrating a modified example of a contact-pressing means in accordance with the second example.

DETAILED DESCRIPTION OF THE INVENTION

[0018] Hereinafter, the preferred embodiments of the present invention will be described with reference to accompanying drawings.

[0019] In description of the present invention, detailed explanation about functions and a construction of the conventional art may be abridged in order not to wander from the gist of the present invention.

[0020] Figures 1~13 show an optical disc loading apparatus in accordance with a first embodiment of the present invention; Figure 1 is a plan view illustrating an optical disc loading apparatus in inserting of a small disc; Figure 2 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position II in Figure 1; Figure 3 is a side view illustrating the

optical disc loading apparatus when the inserted small disc is located at position III in Figure 1; Figure 4 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position IV in Figure 1; Figure 5 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position V in Figure 1; Figure 6 is a side view illustrating the optical disc loading apparatus when the inserted small disc is located at position VI in Figure 1; Figure 7 is a plan view illustrating the optical disc loading apparatus when a large disc is inserted; Figure 8 is a side view illustrating the optical disc loading apparatus when the inserted large disc is located at position VIII in Figure 7; Figure 9 is a side view illustrating the optical disc loading apparatus when the inserted large disc is located at position IX in Figure 7; Figure 10 is a side view illustrating the optical disc loading apparatus when the inserted large disc is located at position X in Figure 7; Figure 11 is a side view illustrating the optical disc loading apparatus when the inserted large disc is located at position XI in Figure 7; Figure 12 is a perspective view illustrating a disc guide; and Figure 13 is a sectional view taken along a line XIII-XIII in Figure 12. As depicted in Figures 1~13, the optical disc loading apparatus in accordance with the first embodiment of the present invention is operated by an operating unit (not shown). It includes a main roller 110 installed at an inlet of an optical disc drive in order to get in/out an optical disc 15a, 15b; a disc guide 170 installed at the opposite of the main roller 110 on the basis of the inserted disc 15a, 15b; a disc path control member 130 installed toward the inlet; a small disc stopping member 140 formed at the drive in order to make the small disc 15a stop at a position mountable onto a spindle 14b; and a large disc stopping member 150 formed at the drive in order to make the inserted large disc 15b stop at a position mountable onto the spindle 14b.

[0021] The path control member 130 is formed so that a proceeding direction of an inserted disc simultaneously contacted to the main roller 110, the disc guide 170 and the path control member 130 is different from a proceeding direction of an inserted disc simultaneously contacted to the main roller 110 and the disc guide 170. The small disc stopping member 140 has a certain height so as to lock a disc proceeding while the disc contacting the main roller 110 and the disc guide 170 simultaneously, and so as not to lock a disc proceeding while the disc contacting the main roller 110, the disc guide 170 and the path control member 130 simultaneously. And, the large disc stopping member 150 has a certain height so as to lock a disc 15a, 15b proceeding while contacting the main roller 110, the disc guide 170 and the path control member 130 simultaneously.

[0022] The path control member 130 can be a sub roller for contacting to an optical disc surface while rotating. The sub roller 130 is a cylindrical roller and has a cleaning means at a surface contacted with the optical disc 15a, 15b in taking in/out of the disc 15a, 15b. The cleaning means is made of cotton flannel.

[0023] In addition, the main roller 110 and the sub roller 130 are respectively combined with the both ends of a roller frame 120 rotationally hinge-joined with a main frame 11 of the optical disc drive. The roller frame 120 includes a main roller arm 120a at which the main roller 110 is hinge-joined; a sub roller arm 120b at which the sub roller 130 is hinge-joined; and a hinge protrusion 120c hinge-joined with a main frame. The sub roller arm 120b is formed so as to close the disc inlet when the main roller 110 is separated from the optical disc by an additional main roller cam unit (not shown). In addition, as depicted in Figure 9, in the roller frame 120, the main roller arm 120a and the sub roller arm 120b are formed in order to make the optical disc 15b proceed in a direction not locked in a small disc stopping member when the optical disc 15b is simultaneously contacted with the main roller 110 and the sub roller 130.

[0024] In addition, the roller frame 120 further includes a spring 180 at which an end is fixed to the roller frame 120 and the other end is fixed to the main frame 11 in order to make the disc 15 adhere closely to the disc guide 170.

[0025] The disc guide 170 includes two disc contact ribs 171, 172 facing the main roller 110. As depicted in Figure 12, in forming of the contact ribs 171, 172, a height h1 is lower than a height h2. Because of that, as depicted in Figure 4, when the disc is inserted between the contact ribs 171, 172 and the main roller 110, the disc can be stably locked in a small disk stopping member 140. However, the objects of the present invention can be achieved by forming the contact ribs 171, 172 so as to make the disc be locked in the small disk stopping member 140 when the disc is inserted between the contact ribs 171, 172 and the main roller 110. In addition, as depicted in Figures 12 and 13, the contact ribs 171, 172 of the disc guide 170 are formed so as to be slant downwardly from the central portion to the both ends in the Y direction in Figure 12. Accordingly, they can contact only to the outer circumference of the disc by being corresponded to the main roller 110 slant upwardly from the central portion to the both ends.

[0026] Hereinafter, the operation of the apparatus in accordance with the first embodiment of the present invention will be described.

[0027] Figures 1~6 show the inserting operation of the small disc 15a.

[0028] When a user inserts the small (optical) disc 15a, the main roller 110 is operated by an optical disc insertion sensing unit (not shown) arranged at the inlet of the optical disc player, when the small disc 15a reaches the main roller 110, the small optical disc 15a can be inserted by the main roller 110. As depicted in Figure 3, when the small disc 15a simultaneously contacts with the main roller 110, the sub roller 130 and the disc guide 170, the small disc 15a is proceeded in the direction not be locked by the small disk stopping member 140.

[0029] As depicted in Figure 4, when the small disc

15a passes the sub roller 130. The proceeding path of the small disc 15a can be determined only by the disc guide 70 and the main roller 110. In more detail, by placing the small disc 15a between the contact ribs 171, 172 of the disc guide 170 and the main roller 110, the small disc 15a proceeds in a direction locked by the small disk stopping member 140.

[0030] As depicted in Figure 5, the small disc 15a proceeds continually and is locked by the small disk stopping member 140, and accordingly the center thereof is arranged at the center of the spindle 14b.

[0031] As depicted in Figure 6, the main roller 110 moves downwardly by a main roller cam unit (not shown), and the small disc 15a is mounted onto the spindle 14b. In addition, because the main roller 110 moves downwardly, the sub roller arm 120b closes the inlet of the disc drive and prevents overlapping disc-insertion.

[0032] Figures 7~11 show the inserting operation of the large disc.

[0033] When the user inserts the large (optical) disc 15b, the main roller 110 is operated by the optical disc insertion sensing unit (not shown) arranged at the inlet of the optical disc player, when the large disc 15b reaches the main roller 110, the large optical disc 15b can be inserted by the main roller 110. As depicted in Figure 9, when the large disc 15b simultaneously contacts with the main roller 110, the sub roller 130 and the disc guide 170, the large disc 15b is proceeded in the direction not be locked by the small disk stopping member 140.

[0034] As depicted in Figure 9, the large disc 15b proceeds continually, passes the small disk stopping member 140 and is locked in the large disk stopping member 150, and accordingly the center thereof is arranged at the center of the spindle 14b.

[0035] As depicted in Figure 11, the main roller 110 moves downwardly by the main roller cam unit (not shown), and the large disc 15b is mounted onto the spindle 14b.

[0036] The main roller cam unit (not shown) can be constructed variously.

[0037] As described above, because the present invention is capable of distinguishing and mounting a different-sized disc with a simple structure, it is possible to reduce a fabrication cost, simplify the operation and improve the operation reliability.

[0038] In addition, because the sub roller is made of cotton flannel, impurities on the surface of the optical disc can be removed.

[0039] Figure 14 is a front view illustrating a modified example of a sub roller in accordance with the first embodiment of the present invention.

[0040] In a sub roller 220, a rotational shaft 221 is rotationally combined with the roller frame, and it is formed so as to be slant upwardly from the center to the both ends. Accordingly, in contacting of the optical disc 15, because it contacts to only the outer side of the optical disc 15, it is possible to minimize damage occurrable onto a data recording surface of the optical disc 15.

[0041] Figure 15 is a side-sectional view illustrating a modified example of a disc path control member not representing the present invention.

[0042] As depicted in Figure 15, the disc path control member includes a spring receiving portion 333 formed at the optical disc drive main body 11; a spring 332 installed in the spring receiving portion 333; and a sub member 330 connected to the spring 332 and performing the up and down motion.

[0043] In addition, by fixing the sub member 330 at the optical disc drive main body 11, the objects of the present invention can be achieved.

[0044] Figure 16 is a plan view illustrating another example of a disc path control member not representing the present invention.

[0045] The optical disc path control member shown in Figure 16 is installed at a position different from that of the optical disc path control member of the first embodiment. In more detail, it is installed at a position in which the small disc 15a does not contact in taking out and the large disc 15b contacts in taking in/out. Accordingly, by preventing the small disc 15a from being contacted to the path control member 130, it is possible to reduce damage occurrable risk of the small disc 15a.

[0046] Figure 17 is a front view illustrating another example of a disc path control member not representing the invention the present invention.

[0047] The optical disc path control member shown in Figure 17 comprised two torsion springs installed at disc inlet. Lower fixing plates 732 are formed at each interior sides of the main frame 11 and a upper stoppers 733 are formed above the lower fixing plates 732 at each interior sides of the main frame 11.

[0048] The bodies 731 of the torsion spring are facing each other. One end 734 of the torsion spring is fixed at the lower fixing plate 732 and the other end 735 of the torsion spring is limited by the upper stopper 733.

[0049] The disk 15a, 15b in contact with the end 735 of the torsion spring proceeds to a small disc locking member 140 and after passing the end 735 the disk 15a, 15b does not proceed to a small disc locking member 140.

[0050] Figures 18~29 show an optical disc loading apparatus in accordance with a second example not representing the invention; Figure 18 is a plan view illustrating the optical disc loading apparatus In inserting of a large disc; Figure 19 is a side view illustrating a large disc cam member in Figure 18; Figure 20 is a side view illustrating a small disc cam member in Figure 18; Figure 21 is a side view illustrating the optical disc loading apparatus in Figure 18 when a large disc cam locking protrusion in Figure 18 is located at a position IIX I; Figure 22 is a side view illustrating the optical disc loading apparatus in Figure 18 when the large disc cam locking protrusion in Figure 19 is located at a position IIX II; Figure 23 is a side view illustrating the optical disc loading apparatus in Figure 18 when the large disc cam locking protrusion in Figure 19 is located at a position IIX III; Figure 24 is a

plan view illustrating the optical disc loading apparatus in inserting of a small disc; Figure 25 is a side view illustrating the optical disc loading apparatus in Figure 24 when the small disc cam locking protrusion in Figure 20 is located at a position IIX V; Figure 26 is a side view illustrating the optical disc loading apparatus when the small disc in Figure 24 contacts to a trigger protrusion; Figure 27 is a side view illustrating the optical disc loading apparatus in Figure 24 when the small disc cam locking protrusion in Figure 20 is located at a position IIX VII; Figure 28 Is a perspective view illustrating a disc guide in Figure 21; Figure 29 is a sectional view taken along a line IIX IX - II X IX.

[0051] As depicted in Figures 18~29, the loading apparatus in accordance with the second example includes a roller frame 420 hinge-joined with the main frame 11; a main roller 410 rotationally combined with the end of the roller frame 420; a roller driving means 660 for rotating the main roller 410; a sub member 430 installed so as to support the same surface of the inserted optical disc 15 with the main roller 410; a contact-pressing means for contact-pressing the optical disc 15 toward the main roller 410, at least two small disc stopping members 440 formed at the main frame 11 in order to make the inserted small disc 15a mount onto the spindle 14b; at least two large disc stopping members 450 formed at the main frame 11 in order to make the inserted large disc 15b mount onto the spindle 14b; a large disc distinguishing means for distinguishing the inserted large disc 15b; and a roller frame driving means for operating the roller frame 420 in order to make the large disc 15b inserted by the distinguishing means not to be locked in the small disc stopping member 440.

[0052] The roller frame 420 includes a main roller arm 420a for combining the main roller 410; a sub member arm 420b formed so as to be opposite to the main roller arm 420a on the basis of the hinge point; and a hinge protrusion 420c formed so as to combine the roller frame 420 with the hinge point 420d.

[0053] It is preferable for the sub member 430 to be a sub roller rotationally combined with the end of the sub member arm 420b. However, it is also possible to be constructed as a member for simply supporting the inserted disc 15. It is preferable for the sub roller 430 to be made of cotton flannel.

[0054] The main roller arm 420a, the sub member arm 420b are arranged so as to make the hinge point 420d be formed on the straight line of the main roller 410 and the sub roller 430.

[0055] The roller driving means 660 includes a driving motor 661 and a gear set 663 connected to a driving shaft 662 of the driving motor 661 and the rotational shaft 411 of the main roller in order to transmit power of the driving motor 661 to the rotational shaft 411.

[0056] The contact-pressing means includes a hinge protrusion 670 projected from the disc guide 470 of the main frame 11 so as to make the bottom end surface of the inserted optical disc 15 place at the hinge point 420d of the roller frame in order to make the inserted optical disc 15 contact to the main roller 410 and the sub roller 430; and a roller frame elastic member 480 in which one end is fixed to the roller frame 420, the other end is fixed to the main frame 11 in order to make the main roller 410 contact-press the inserted optical disc 11. Accordingly, when the optical disc is inserted between the sub roller 430, the main roller 410 and the hinge protrusion 670, the main roller 410 can be operated while maintaining a certain contact-pressing force to the optical disc 15.

[0057] The disc guide 470 includes two contact ribs 471; 472 facing the main roller 410. As depicted in Figure 27, in forming of the contact ribs 471, 472, h1 is lower than h2. Because of that, as depicted in Figure 25, when the disc is inserted between the contact ribs 471, 472 and the main roller 410, the disc can be stably locked by the small disk stopping member 440. However, each height of the contact ribs 471, 472 is determined so as to lock the disc in the small disk stopping member 440. In addition, as depicted in Figures 27 and 28, the contact ribs 471, 472 of the disc guide 470 are slant from the center to the both ends in the Y direction in Figure 27. Because of that, they are contacted to only the outer circumference of the disc by corresponding to the main roller 410 having a hyperboloid shape.

[0058] As depicted in Figure 21, the small disc stopping member 440 is downwardly projected from the top plate of the main frame 11.

[0059] In addition, as depicted in Figure 21, the large disc stopping member 450 is downwardly projected from the top plate of the main frame 11.

[0060] The large disc distinguishing means includes a a large disc trigger member 610. The large disc trigger member has trigger protrusion 612 protruded from the large disc trigger member 610; a hinge joining portion 613 which make the large disc trigger member 610 connected to main frame 11; and, a cam pressing portion 614 formed at the opposite end of the trigger protrusion 612 on the basis of the hinge joining potion 613.

[0061] The trigger protrusion 612 is formed at the position which can be contacted to the outer circumference of the inserted large disc 15b before contacting to the small disc stopping member 440 and can not contacted to the outer circumference of the inserted small disc 15a.

[0062] The roller frame driving means can be constructed as a large disc cam unit 630 operated by the large disc trigger member 610. The large disc cam unit 630 includes a cam member 631 installed movably toward the taking in/out direction of the disc inserted by being contacted to the cam pressing portion 614; a gear hole 636 formed long in the moving direction of the cam member 631; a lack gear 637 formed at the internal bottom surface of the gear hole 636; a pinion 638 engaged with the lack gear 637 when the cam pressing portion 614 moves the cam member 631; a cam driving shaft 639 connected to the pinion 638; a cam driving motor (not shown) for driving the cam driving shaft 639; a locking avoidance cam slant 632 formed at the cam member

so as to move the roller frame in order to make the inserted disc 15 not to be locked to the small disc stopping member 440 by moving the cam member 631 with the cam driving motor (not shown); a disc proceeding horizontal plane 633 formed so as to proceed the disc on the locking avoidance cam slant 632; and a cam separation slant 634 extended from the disc proceeding horizontal plane 633 in order to make the main roller 410 separate from the inserted optical disc 15.

[0063] In addition, the large disc cam unit 630 includes a locking protrusion 615 projected from the side of the cam member 631 so as be locked in the cam pressing portion 614; a restoring spring 639 at which the end is fixed to the main frame 11, the other end is fixed to the cam member 630 in order to make the cam member return to the initial position when the combination of the lack gear 637 and the pinion 638 is released; and a large disc cam protrusion 421 formed at the side of the roller frame in order to move toward the cam surface of the cam member 631.

[0064] In addition, the optical disc loading apparatus in accordnace with the second example further includes a small disc trigger member 620 for sensing when the outer circumference of the small disc 15b reaches the small disc stopping member 440; and a small disc cam unit 640 operated by the small disc trigger member 620.

[0065] The small disc trigger member 620 includes a trigger protrusion 622 contacted to the outer circumference of the small disc 15a before it reaches the small disc stopping member 440; a hinge joining portion having the trigger protrusion 622 at the end and hinge-joined with the main frame 11; and a cam pressing portion 624 formed at the opposite end of the trigger protrusion 622 on the basis of the hinge joining portion 623.

[0066] The small disc cam unit 640 includes a cam member 634 installed movably toward the taking in/out direction of the disc inserted by being contacted to the cam pressing portion 624; a gear hole 646 formed long In the moving direction of the cam member 631; a lack gear 647 formed at the internal bottom surface of the gear hole 646; a pinion 648 engaged with the lack gear 647 when the cam pressing portion 624 moves the cam member 641; a cam driving shaft 639 connected to the pinion 648; a cam driving motor (not shown) for driving the cam driving shaft 639; and a cam separation slant642 for making the main roller 610 separate from the inserted optical disc 15b according to the moving of the cam member 631 by the cam driving motor (not shown).

[0067] In addition, In order to move along the cam surface of the cam member 641, a small disc cam protrusion 422 is formed at the side surface of the roller frame.

[0068] Hereinafter, the operation of the apparatus in accordance with the second example will be described.

[0069] Inserting the large disc 15b will be described.

[0070] When the large disc 15b is inserted, the main roller 410 is rotated by the roller driving means 660, and the large disc 15b is inserted into the main frame 11. As depicted in Figure 18, when the inserted large disc 15b is placed at an I position, it presses the trigger protrusion 612, and the trigger member 611 performs the rotation in the counter-clockwise direction centering around the hinge joining portion 613. According to the rotation of the trigger member 611, the cam pressing portion 614 presses the locking protrusion 615, and accordingly the large disc cam member 631 is moved.

[0071] According to the moving of the large disc cam member 631, the lack gear 637 is engaged with the pinion 638, the large disc cam member 631 is continually moved, and accordingly the large disc cam protrusion 421 is moved from the IIX I position to the IIX II position. Accordingly, while the large disc cam protrusion 421 moves along the locking avoidance cam slant 632, the main roller frame 420 is rotated, and the main roller 410 is rotated downwardly as shown in Figure 22. As depicted in Figure 22, the large disc 15b is slant by the main roller 410, the sub roller 420 and the hinge protrusion and proceeds continually without being locked by the small disc stopping member 440. Afterward, when the large disc stopping member 450 is locked, the large disc cam protrusion is moved from the IIX II position to the IIX III position along the cam separation slant 634. As depicted in Figure 23, the main roller 410 is completely separated from the large disc 15b, and accordingly the large disc 15b is mounted onto the spindle 14b.

[0072] Inserting the small disc 15a will be described.

[0073] When the small disc 15a is inserted, the main roller 410 is rotated by the roller driving means 660, and the small disc 15a is inserted into the main frame 11. When the inserted places at the position shown in Figure 24, it presses the trigger protrusion 622, and the small disc trigger member 621 performs the rotation in the clockwise direction centering around the hinge joining portion 623. According to the rotation of the trigger member 621, the cam pressing portion 624 presses the locking protrusion 625, and the small disc cam member 641 is moved.

[0074] According to the moving of the small disc cam member 641, as depicted in Figure 20, the lack gear 647 is engaged with the pinion 648, the small disc cam member 641 moves continually, and the small disc cam protrusion 422 passes the cam separation slant 642. Accordingly, as depicted in Figure 27, the main roller 410 is completely separated from the small disc 15a, and the small disc 15a is mounted onto the spindle.

[0075] As described above, because the second example is capable of distinguishing and mounting a different-sized disc with a simple structure, it is possible to reduce a fabrication cost, simplify the operation and improve the operation reliability.

[0076] In addition, because the sub roller is made of cotton flannel, impurities on the surface of the optical disc can be removed.

[0077] Figure 30 is a front view illustrating a modified example of a sub roller in accordance with the second example.

[0078] In the sub roller 520, the rotational shaft 421 is

rotationally combined with the roller frame 420, and it has a hyperboloid shape.

[0079] Accordingly, when the sub roller 520 contacts to the optical disc 15, because it can contact only to the outer end of the optical disc 15, damage occurrable onto the data recording surface of the optical disc 15 can be minimized.

[0080] Figure 31 is a conceptual view illustrating a modified example of a contact-pressing means in accordance with the second example.

[0081] The contact-pressing means includes a contact-pressing member 771; a contact-pressing elastic member 772 at which the end is fixed to the contact-pressing member 771, the other end is fixed to the main frame 11 in order to press the inserted optical disc 15 toward the main roller 410 and the sub member 430; and a separation preventive member 773 at which the end is fixed to the roller frame 420, the other end is fixed to the main frame 11 in order to prevent the main roller 410 separate from the roller frame elastic member 480 and the contact-pressing member 771 contact-pressing the inserted optical disc 15.

[0082] As described above, because the contact-pressing member 771 contacts the inserted optical disc 15 to the main roller 410 with a certain contact-pressing force, the main roller 410 can efficiently move the optical disc 15.

INDUSTRIAL APPLICABILITY

[0083] As described above, the present invention can have various advantageous.

[0084] First, the present invention is capable of distinguishing a size of a disc and changing a disc moving path according to the size of the disc inserted into an optical disc player with a simple structure, and accordingly it is possible to reduce a production cost.

[0085] By simplifying the structure, noise occurrable in operation of the apparatus in the disc loading can be sharply reduced.

[0086] In addition, by simplifying a disk loading operation, operational reliability can be improved.

[0087] In addition, by using a sub roller made of cotton flannel, impurities on the surface of an optical disc can be removed.

Claims

1. An optical disc loading apparatus, comprising:

a main roller (110) installed at an inlet side of an optical disc drive in order to take in/out an optical disc (15a, 15b);
a disc guide (170) installed in the opposite direction of the main roller (110) with an inserted disc (15a, 15b) therebetween;
a small disc stopping member (140) formed at the drive in order to make an inserted small disc (15a) stop at a position mountable onto a spindle (14b);
a large disc stopping member (150) formed at the drive in order to make an inserted large disc (15b) stop at a position mountable onto a spindle (14b); and
a disc path control member (130),
wherein the disc path control member (130) is formed so that an inserted disc (15a, 15b) contacting to the main roller (110), the disc guide (170) and the path control member (130) simultaneously has a proceeding direction different from that of an inserted disc contacting to the main roller, the disc guide simultaneously;
the small disc stopping member (140) has a certain height in order to stop a disc proceeding while simultaneously contacting to the main roller (110) and
the disc guide (170), and in order not to stop a disc proceeding while simultaneously contacting to the main roller (110), the disc guide (170) and
the path control member (130); and
the large disc stopping member (150) has a certain height in order to lock a disc proceeding while simultaneously contacting to the main roller (110), the disc guide (170) and the path control member (130);
characterized in that
the disc path control member (130) is installed between the main roller (110) and the inlet of the drive; and
a roller frame (120), at which the main roller (110) is hinge-joined at the end and the disc path control member (130) is formed at the other end, is rotationally hinge-joined with the main frame (11) of the optical disc drive.

2. The apparatus of claim 1, wherein the disc path control member (130) has a sub roller installed at the end contacting to an inserted disc (15a, 15b).

3. The apparatus of claim 2, wherein the sub roller (130) has a hyperboloid shape so as to contact only with the outer circumference of an optical disc (15a, 15b).

4. The apparatus of claim 1, further comprising:

a contact-pressing spring (180) at which the end is fixed to the main frame (11) of the optical disc drive and the other end is fixed to the roller frame (120) in order to make the main roller (110) act a contact-pressing force on an inserted disc (15).

5. The apparatus of claim 1, wherein the end of the roller frame (120) at which the disc path control mem-

ber (130) is installed is bended in order to close the drive inlet when the main roller (110) is separated from an inserted disc (15).

6. The apparatus of claim 1, wherein the disc path control member (130) includes a cleaning means at a surface contacted to an inserted disc.

7. The apparatus of claim 6, wherein the cleaning means is made of cotton flannel.

8. The apparatus of claim 1, wherein the disc guide (170) includes two disc contact ribs (171, 172) vertically long at right angles to a proceeding direction of an optical disc (15).

9. The apparatus of claim 8, wherein each contact rib (171, 172) has a different height in order to make an inserted optical disc (15) be stopped completely in the small disc stopping member (140).

Patentansprüche

1. Ladevorrichtung für optische Disk, aufweisend:

eine Hauptwalze (110), welche an einer Einlassseite eines Laufwerks für eine optische Disk angeordnet ist, um eine optische Disk (15a, 15b) aufzunehmen/auszugeben;
eine Diskführung (170), welche in der zur Hauptwalze (110) gegenüberliegenden Richtung angeordnet ist mit einer eingeführten Disk (15a, 15b) dazwischen;
ein Anschlagselement (140) für eine kleine Disk, das am Laufwerk gebildet ist, um eine eingeführte kleine Disk (15a) in einer Position anhalten zu lassen, in welcher sie auf einer Spindel (14b) anbringbar ist;
ein Anschlagselement (150) für eine große Disk, das am Laufwerk gebildet ist, um eine eingeführte große Disk (15b) in einer Position anhalten zu lassen, in welcher sie auf einer Spindel (14b) anbringbar ist; und
ein Diskweg-Steuerelement (130),
wobei das Diskweg-Steuerelement (130) so ausgebildet ist, dass eine eingeführte Disk (15a, 15b), die gleichzeitig die Hauptwalze (110), die Diskführung (170) und das Weg-Steuerelement (130) kontaktiert, eine Bewegungsrichtung aufweist, welche sich von der einer eingeführten Disk unterscheidet, welche die Hauptwalze und die Diskführung gleichzeitig kontaktiert;
wobei das Anschlagselement (140) für die kleine Disk eine gewisse Höhe aufweist, um eine Disk anzuhalten, welche sich bewegt während sie gleichzeitig die Hauptwalze (110) und die Diskführung (170) kontaktiert, und
um eine sich bewegende Disk nicht anzuhalten, während sie die Hauptwalze (110), die Diskführung (170) und das Weg-Steuerelement (130) kontaktiert; und
wobei das Anschlagselement (150) für eine große Disk eine gewisse Höhe hat, um eine sich bewegende Disk zu verriegeln, während sie gleichzeitig die Hauptwalze (110), die Diskführung (170) und das Wegsteuerelement (130) kontaktiert;
dadurch gekennzeichnet, dass das Diskweg-Steuerelement (130) zwischen der Hauptwalze (110) und dem Einlass des Laufwerks installiert ist; und
dass ein Walzenrahmen (120), an dessen einem Ende die Hauptwalze (110) gelenkig verbunden ist und das Diskweg-Steuerelement (130) am anderen Ende gebildet ist, drehbar gelenkig mit dem Hauptrahmen (11) des Laufwerks der optischen Disk verbunden ist.

2. Vorrichtung nach Anspruch 1, wobei das Diskweg-Steuerelement (130) eine Hilfswalze hat, die an dem Ende angebracht ist, welches eine eingeführte Disk (15a, 15b) kontaktiert.

3. Vorrichtung nach Anspruch 2, wobei die Hilfswalze (130) eine Hyperboloidform aufweist, um so nur mit dem äußeren Umfang einer optischen Disk (15a, 15b) zu kontaktieren.

4. Vorrichtung nach Anspruch 1, ferner aufweisend:

eine in Kontakt drückende Feder (180), bei welcher das Ende am Hauptrahmen (11) des Laufwerks der optischen Disk befestigt ist und das andere Ende am Walzenrahmen (120) befestigt ist, um die Hauptwalze (110) zu veranlassen, als eine Kontaktdruckkraft auf eine eingeführte Disk (15) auszuüben.

5. Vorrichtung nach Anspruch 1, wobei das Ende des Walzenrahmens (120), an welchem das Diskweg-Steuerelement (130) installiert ist, gebogen ist, um den Laufwerkeinlass zu verschließen, wenn die Hauptwalze (110) von einer eingeführten Disk (15) getrennt ist.

6. Vorrichtung nach Anspruch 1, wobei das Diskweg-Steuerelement (130) ein Reinigungsmittel an einer Oberfläche aufweist, welche mit einer eingeführten Disk in Kontakt ist.

7. Vorrichtung nach Anspruch 6, wobei das Reinigungsmittel aus Baumwollflanell hergestellt ist.

8. Vorrichtung nach Anspruch 1, wobei die Diskführung (170) zwei Diskkontaktrippen (171, 172) vertikal lang

in rechten Winkeln zu einer Bewegungsrichtung einer optischen Disk (15) aufweist.

9. Vorrichtung nach Anspruch 8, wobei jede Kontaktrippe (171, 172) eine unterschiedliche Höhe aufweist, um eine eingeführt Disk (15) zu veranlassen, völlig am Anschlagselement (140) für kleine Disks angehalten zu werden.

Revendications

1. Appareil de chargement de disque optique, comprenant :

un rouleau principal (110) installé du côté d'une entrée d'un lecteur de disque optique afin d'introduire/éjecter un disque optique (15a, 15b) ;
un guide-disque (170) installé dans la direction opposée au rouleau principal (110) avec un disque (15a, 15b) inséré entre ceux-ci ;
un élément d'arrêt de petit disque (140) formé au niveau du lecteur afin de faire en sorte qu'un petit disque (15a) inséré s'arrête à une position permettant son montage sur une broche (14b) ;
un élément d'arrêt de grand disque (150) formé au niveau du lecteur pour faire en sorte qu'un grand disque (15b) inséré s'arrête à une position permettant son montage sur une broche (14b) ; et
un élément (130) de commande du trajet d'un disque,
dans lequel l'élément (130) de commande du trajet d'un disque est formé de manière à ce qu'un disque inséré (15a, 15b) entrant simultanément en contact avec le rouleau principal (110), le guide-disque (170) et
l'élément (130) de commande du trajet ait une direction d'avance différente de celle d'un disque inséré entrant simultanément en contact avec le rouleau principal et le guide-disque ;
l'élément d'arrêt de petit disque (140) présente une certaine hauteur afin d'arrêter un disque se déplaçant tout en entrant simultanément en contact avec le rouleau principal (110) et le guide-disque (170) et afin de ne pas arrêter un disque se déplaçant tout en entrant simultanément en contact avec le rouleau principal (110), le guide-disque (170) et l'élément (130) de commande du trajet ; et
l'élément d'arrêt de grand disque (150) présente une certaine hauteur afin de verrouiller un disque se déplaçant tout en entrant simultanément en contact avec le rouleau principal (110), le guide-disque (170) et l'élément (130) de commande du trajet ;
caractérisé en ce que
l'élément (130) de commande du trajet d'un disque est installé entre le rouleau principal (110) et l'orifice d'entrée du lecteur ; et
un châssis de rouleau (120) à l'extrémité duquel s'articule le rouleau principal (110) et à l'autre extrémité duquel est formé l'élément (130) de commande du trajet d'un disque, s'articule de manière rotative sur le châssis principal (11) du lecteur de disque optique.

2. Appareil selon la revendication 1, dans lequel l'élément (130) de commande du trajet d'un disque a un rouleau secondaire installé à l'extrémité en contact avec un disque inséré (15a, 15b).

3. Appareil selon la revendication 2, dans lequel le rouleau secondaire (130) a une forme hyperboloïdale afin de n'entrer en contact qu'avec la circonférence extérieure d'un disque optique (15a, 15b).

4. Appareil selon la revendication 1, comprenant en outre :

un ressort de contact-pression (180) dont l'extrémité est fixée au châssis principal (11) du lecteur de disque optique et dont l'autre extrémité est fixée au châssis de rouleau (120) afin de faire en sorte que le rouleau principal (110) exerce une force de contact-pression sur un disque inséré (15).

5. Appareil selon la revendication 1, dans lequel l'extrémité du châssis de rouleau (120) sur lequel est installé l'élément (130) de commande du trajet d'un disque est courbée afin de fermer l'entrée du lecteur lorsque le rouleau principal (110) se sépare d'un disque inséré (15).

6. Appareil selon la revendication 1, dans lequel l'élément (130) de commande du trajet d'un disque comprend un moyen de nettoyage sur une surface venant au contact d'un disque inséré.

7. Appareil selon la revendication 6, dans lequel le moyen de nettoyage est constitué de flanelle de coton.

8. Appareil selon la revendication 1, dans lequel le guide-disque (170) comprend deux nervures de contact de disque (171, 172) verticalement longues à angle droit par rapport à une direction de déplacement d'un disque optique (15).

9. Appareil selon la revendication 8, dans lequel chaque nervure de contact (171, 172) a une hauteur différente afin de faire en sorte qu'un disque optique inséré (15) soit entièrement arrêté par l'élément d'arrêt de petit disque (140).

FIG. 1

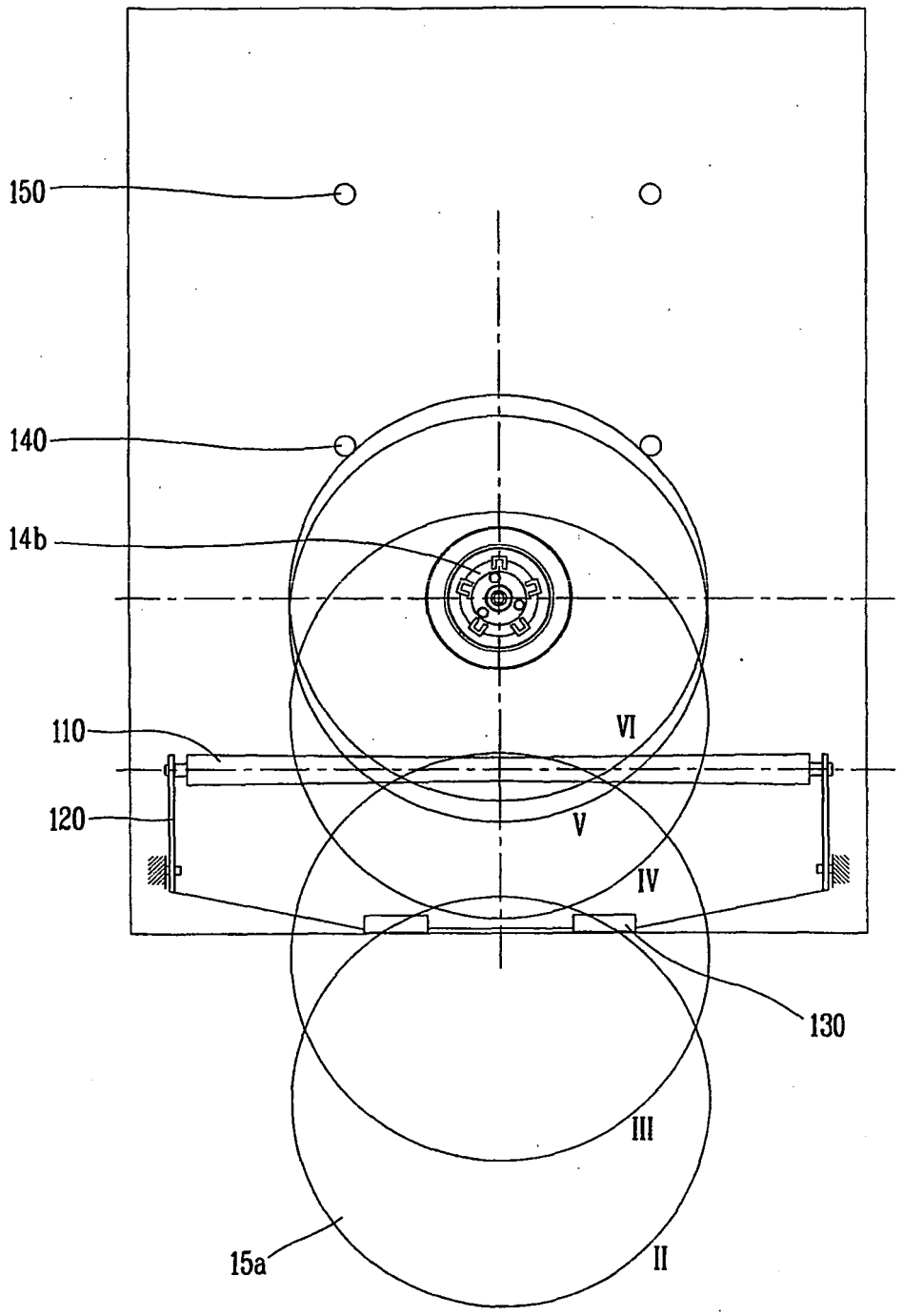


FIG. 2

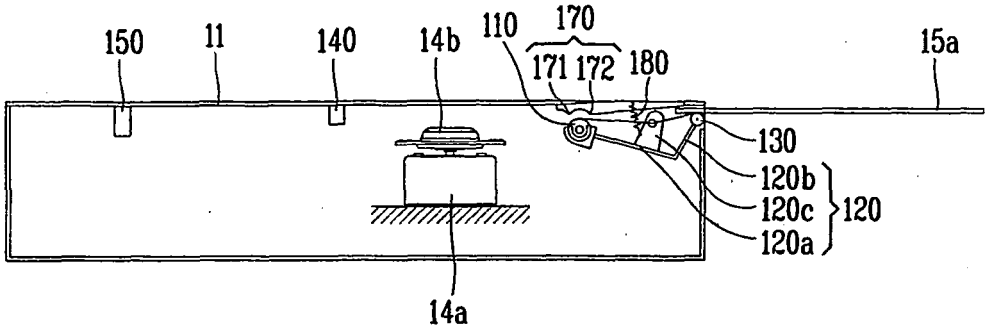


FIG. 3

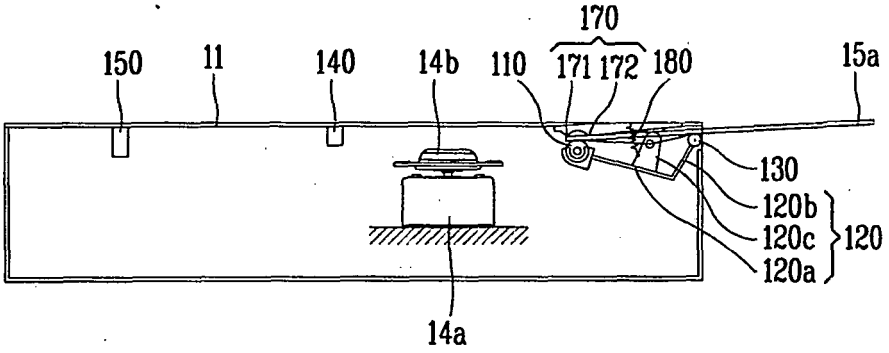


FIG. 4

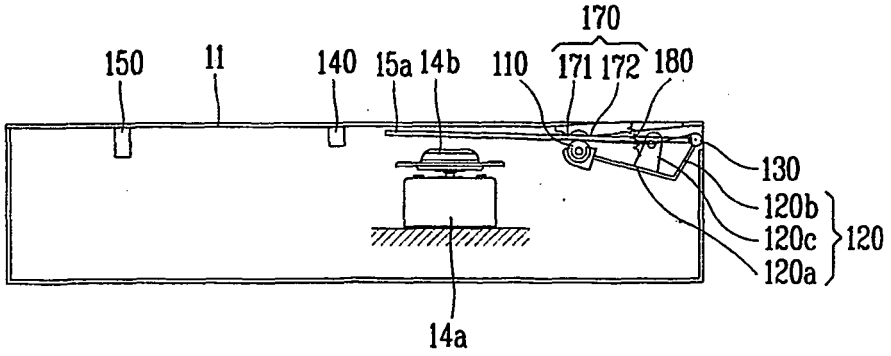


FIG. 5

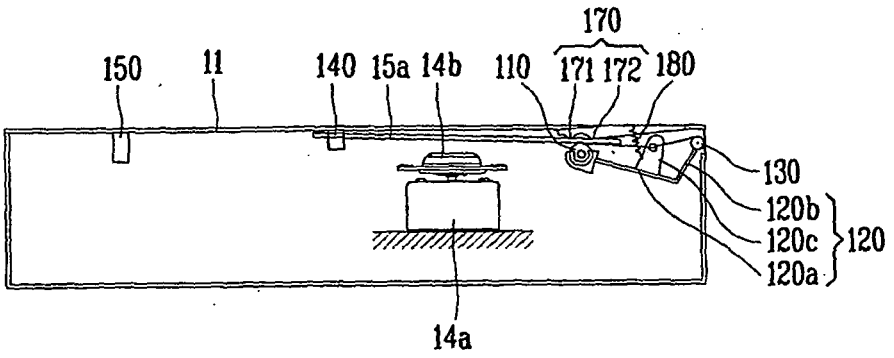

170
150
11
140
15a
14b
110
171
172
180
130
120b
120c
120
120a
14a

FIG. 6

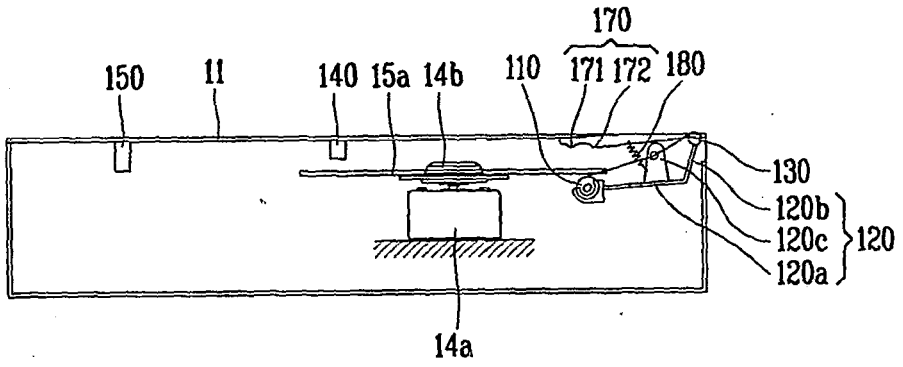

170
150
11
140
15a
14b
110
171
172
180
130
120b
120c
120
120a
14a

FIG. 7

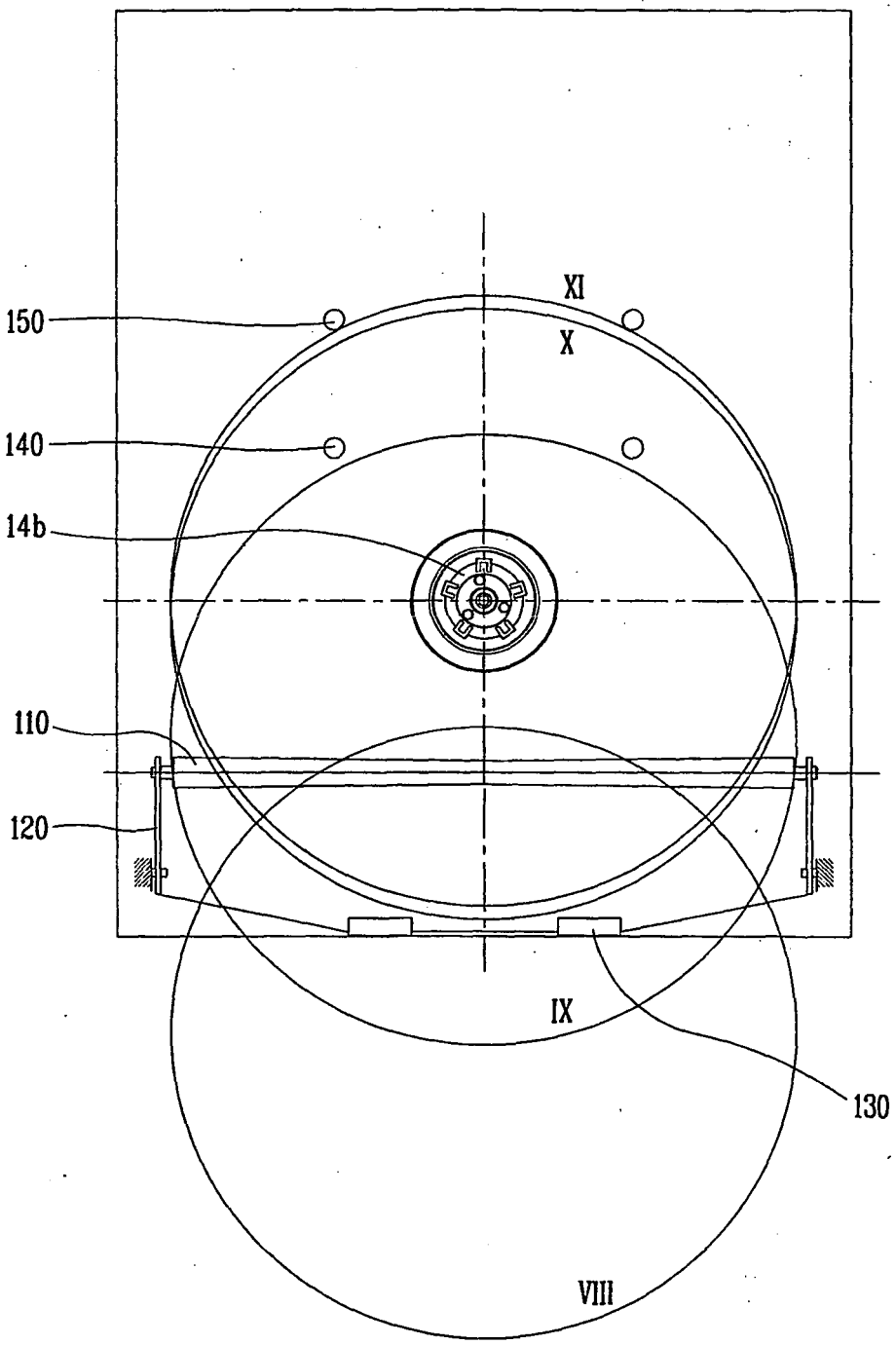


FIG. 8

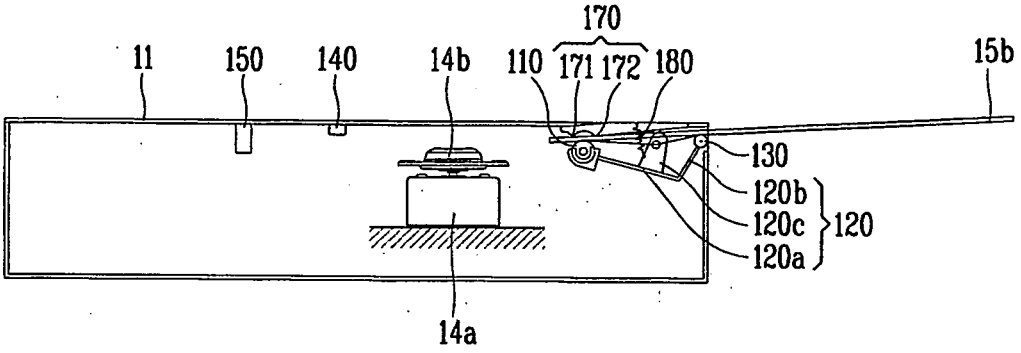


FIG. 9

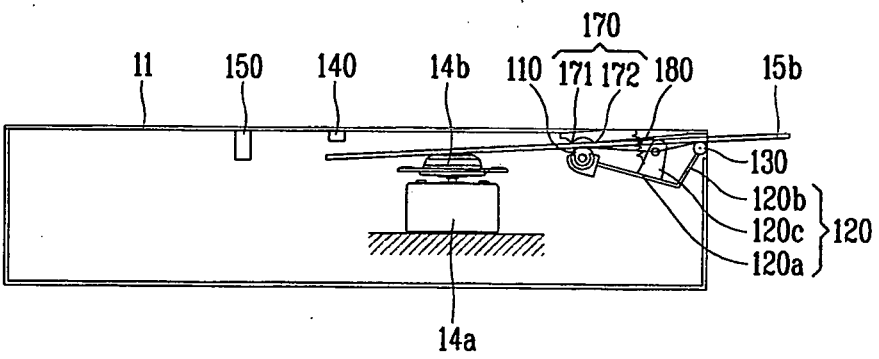


FIG. 10

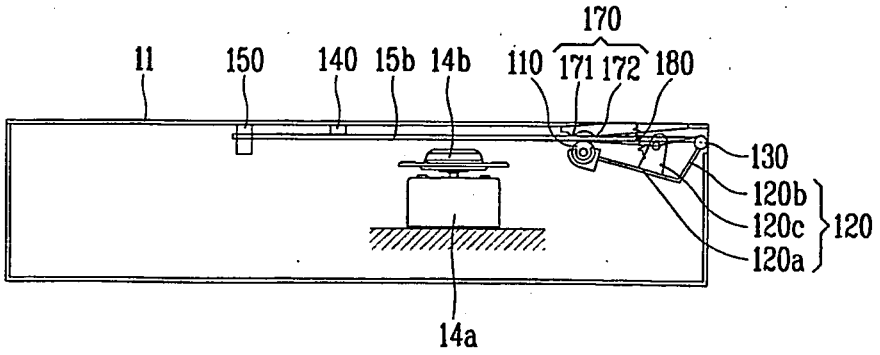


FIG. 11

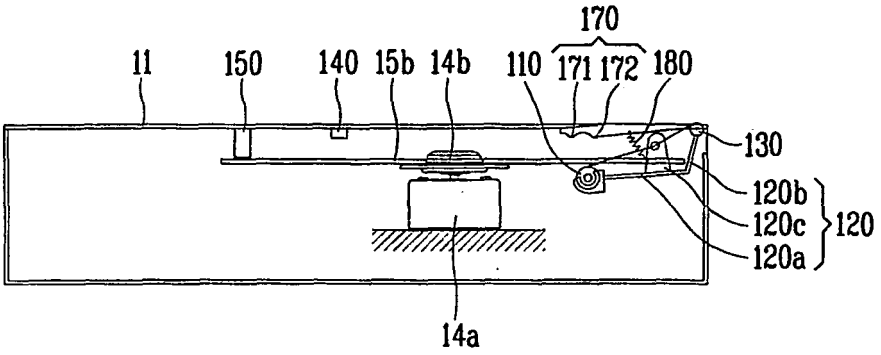

170
11
150
140
15b
14b
110
171
172
180
130
120b
120c
120a
120
14a

FIG. 12

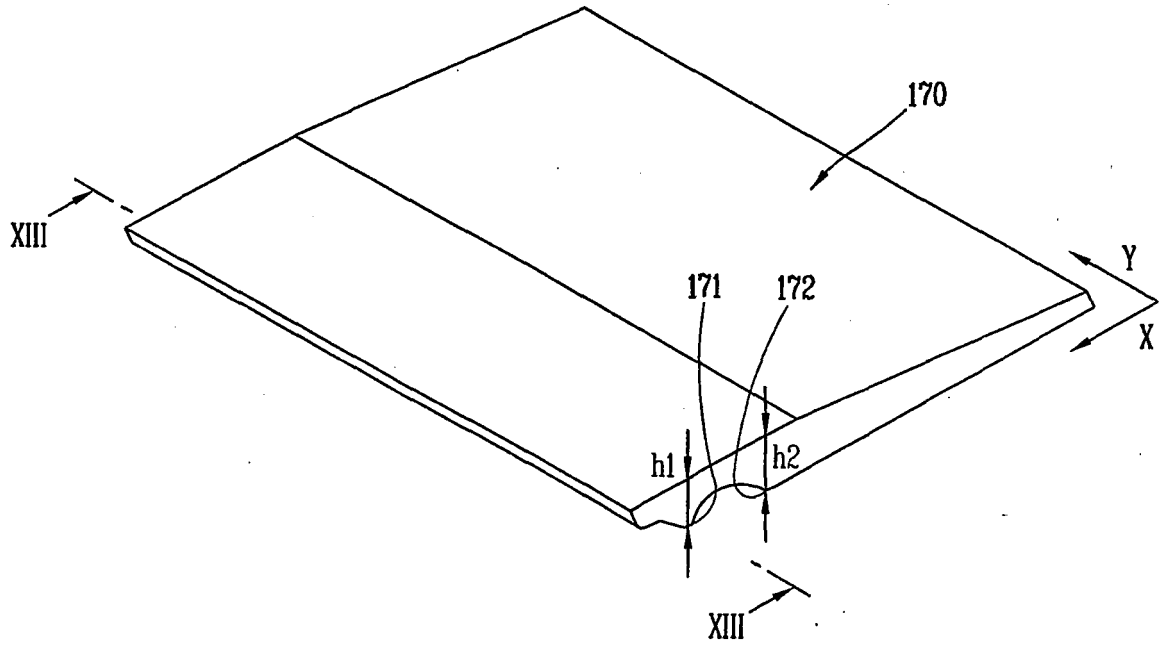

170
XIII
Y
X
171
172
h1
h2
XIII

FIG. 13

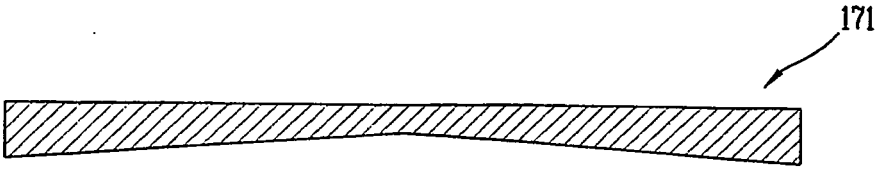


FIG. 14

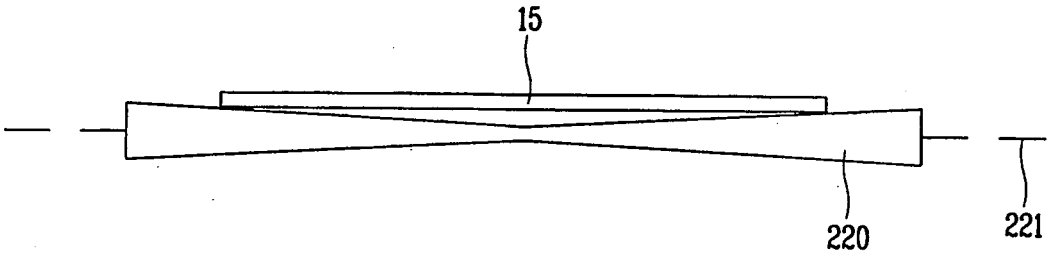


FIG. 15

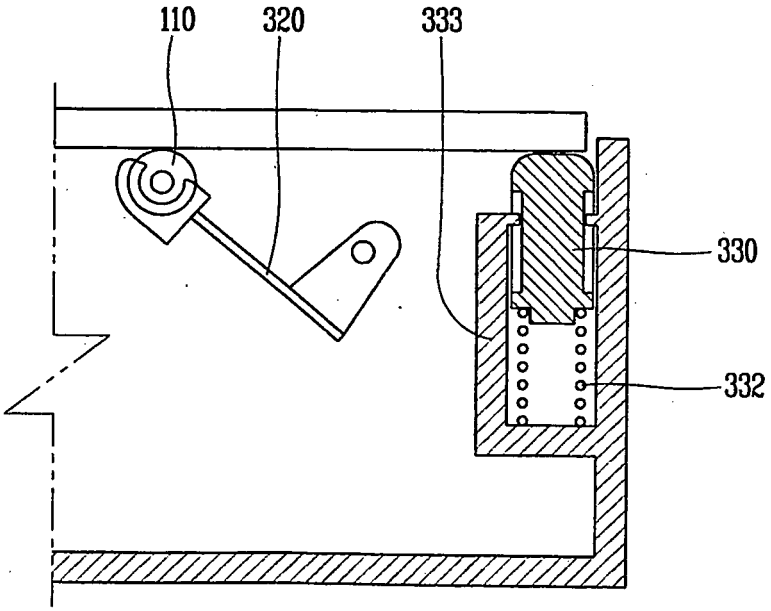


FIG. 16

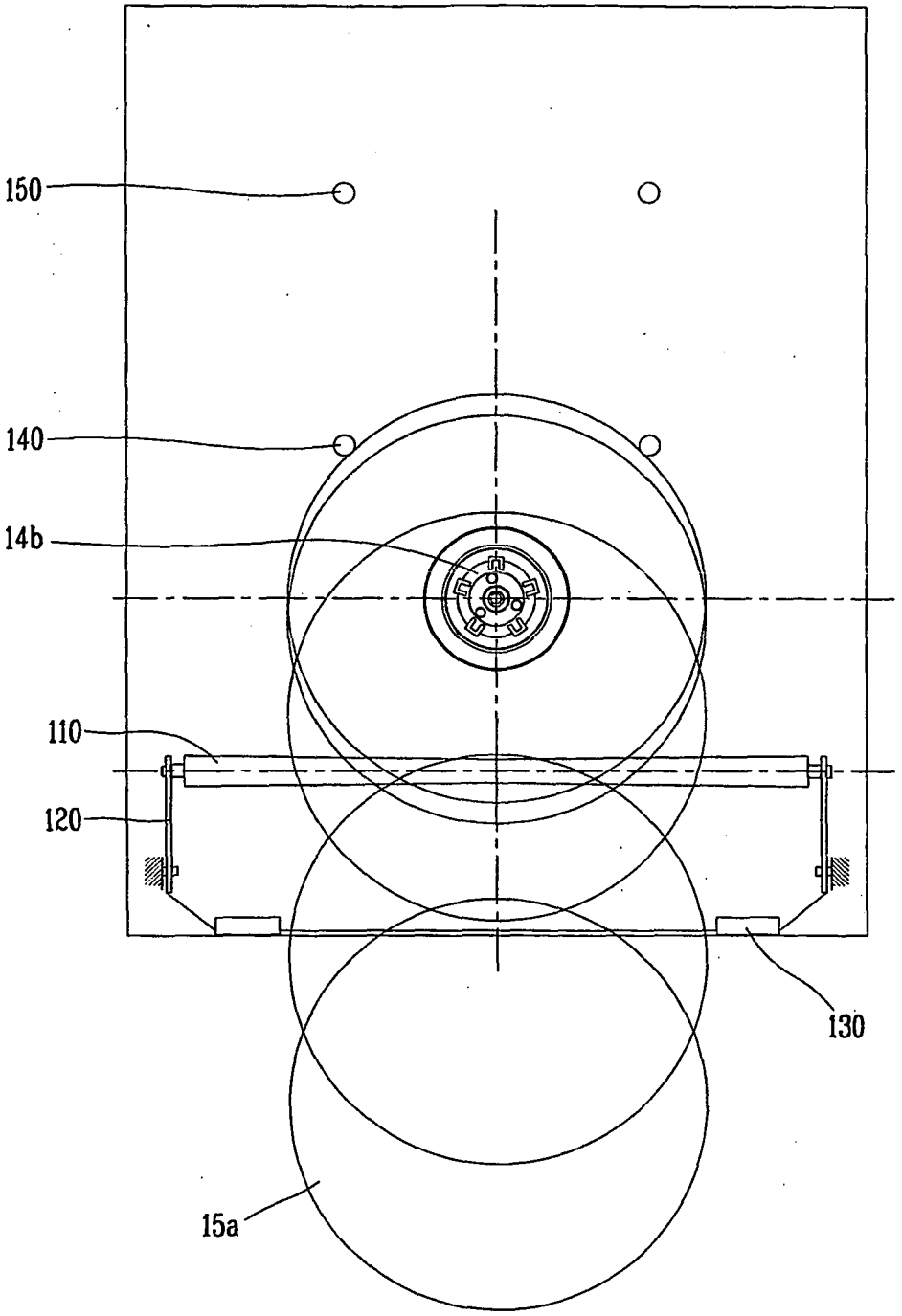


FIG. 17

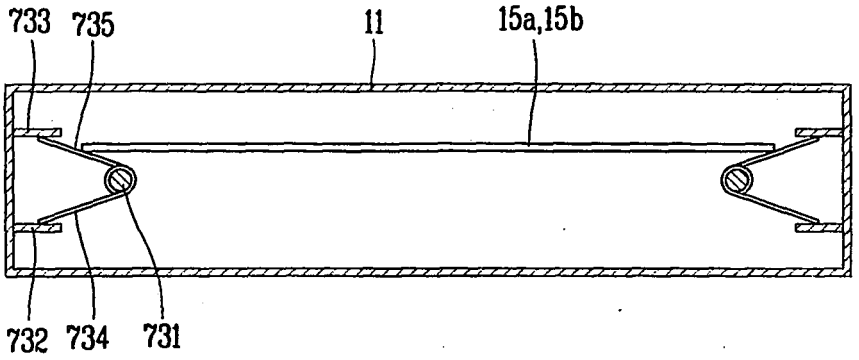


FIG. 18

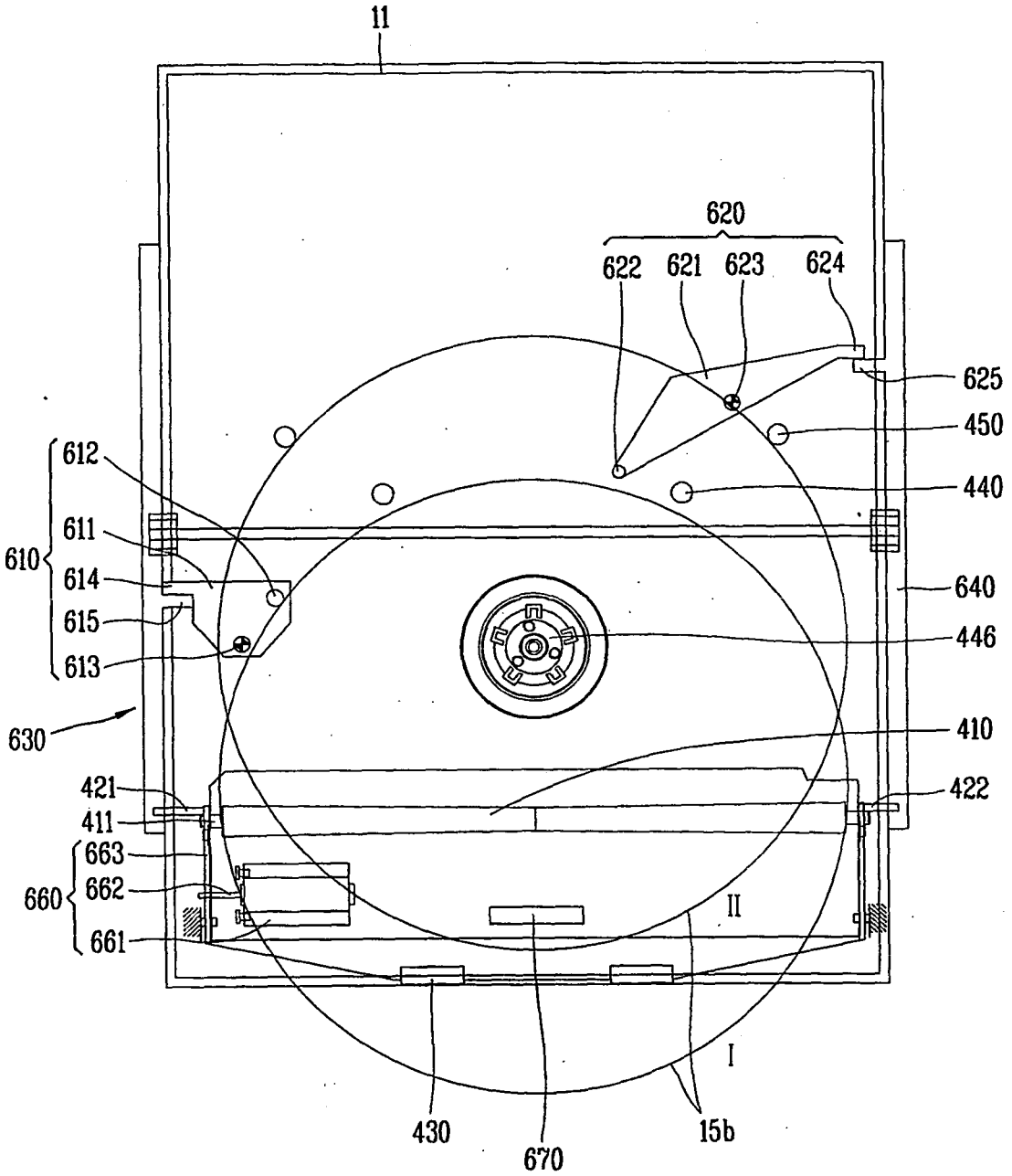

11
620
622
621
623
624
625
450
440
612
611
610
614
615
613
640
446
630
410
421
422
411
663
662
660
661
II
I
430
670
15b

FIG. 19

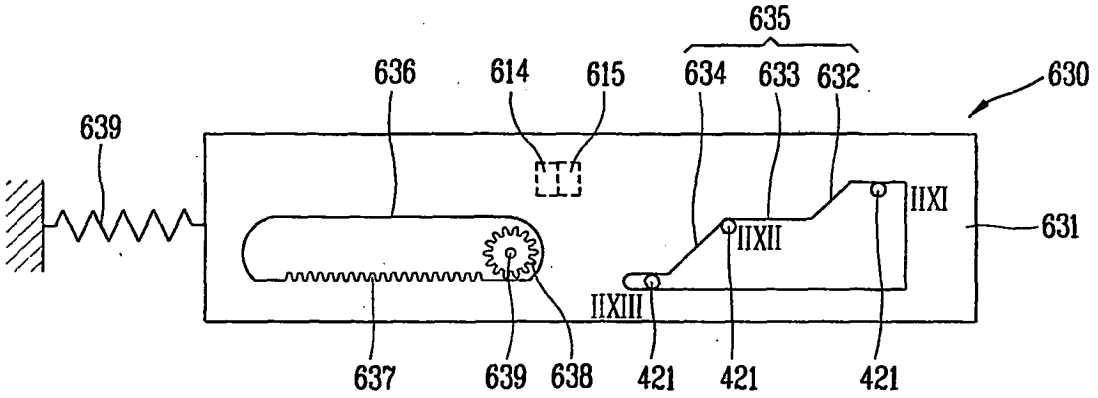


FIG. 20

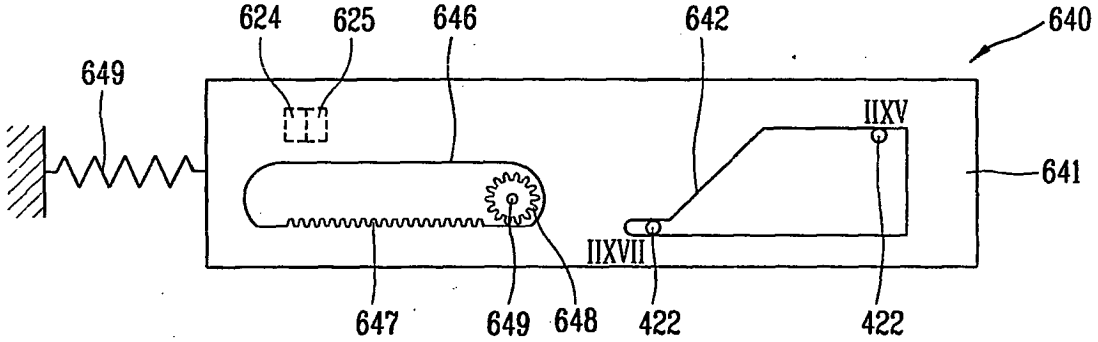


FIG. 21

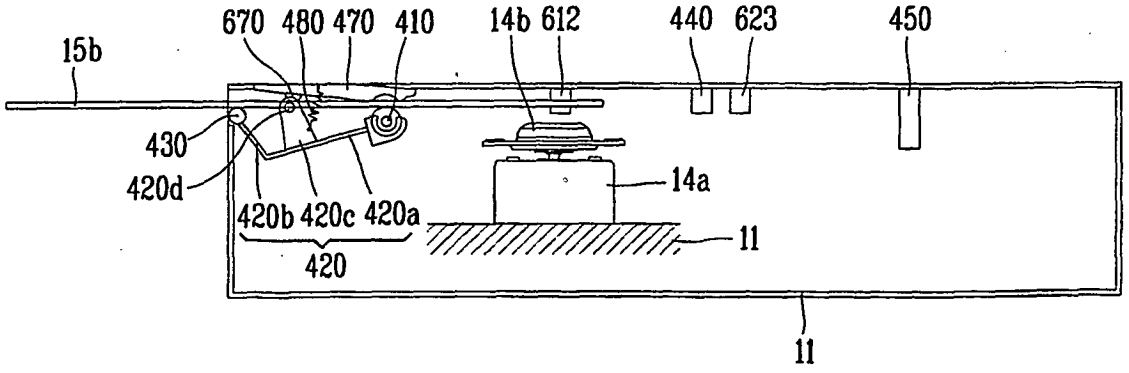


FIG. 22

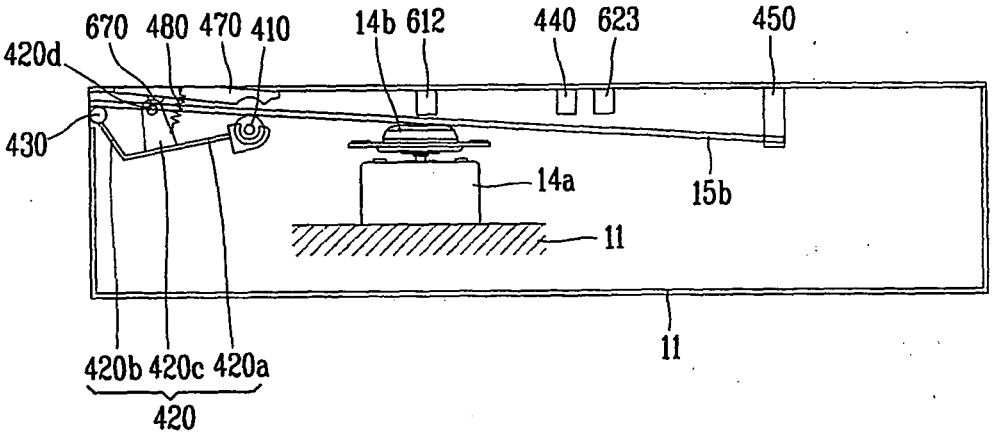

670
480
470
410
14b
612
440
623
450
420d
430
14a
15b
11
11
420b
420c
420a
420

FIG. 23

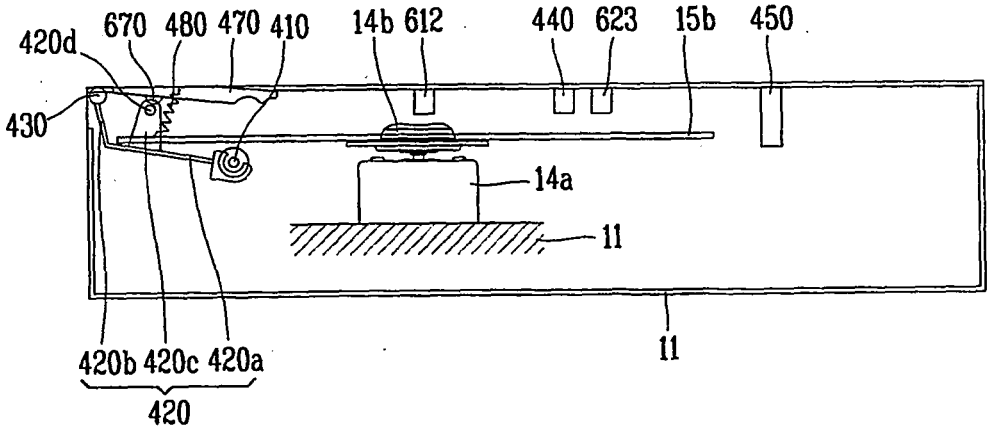

420d
670
480
470
410
14b
612
440
623
15b
450
430
14a
11
11
420b
420c
420a
420

FIG. 24

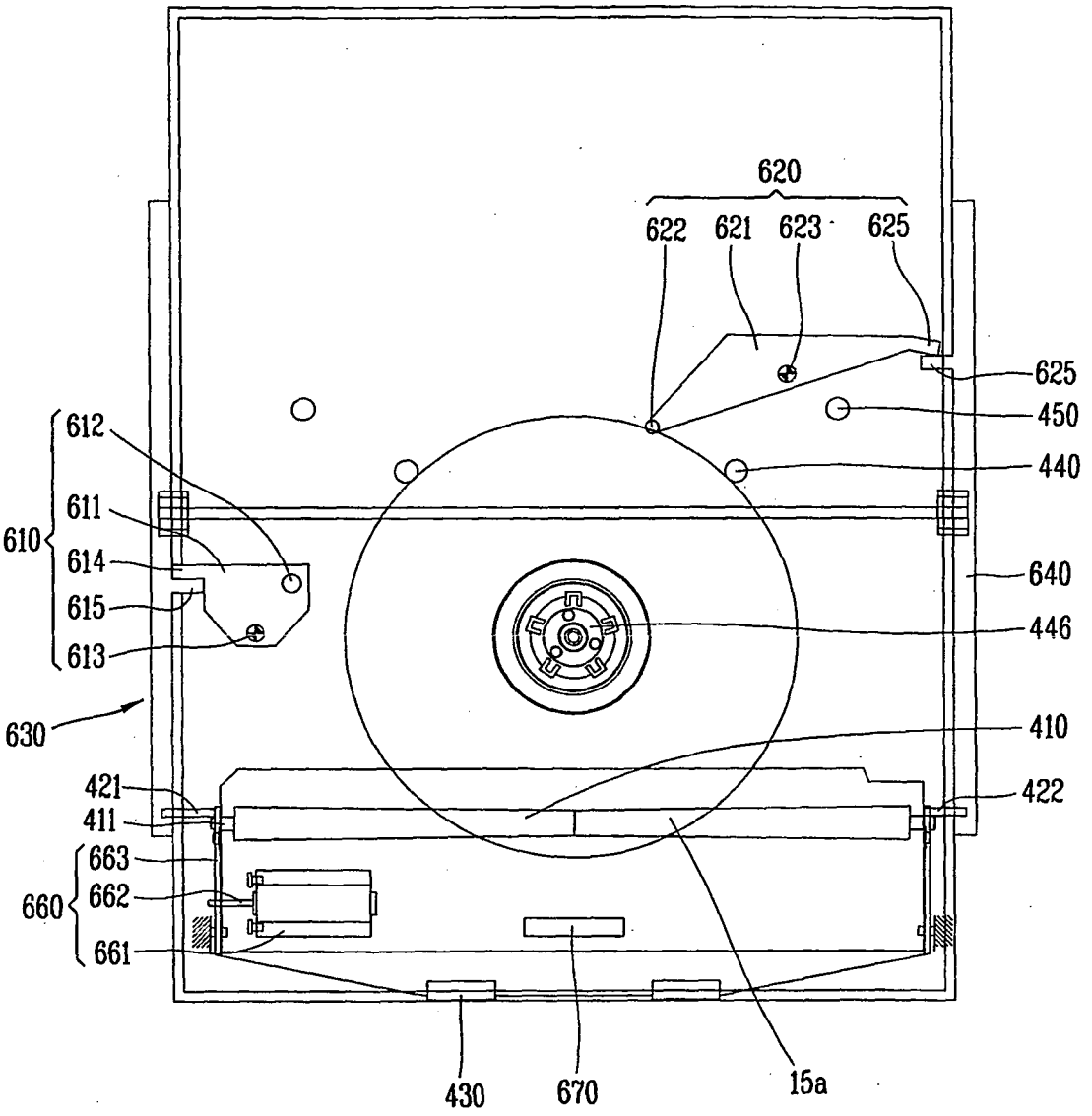

620
622
621
623
625
625
450
440
612
611
610
614
615
613
640
446
630
410
421
422
411
663
662
660
661
430
670
15a

FIG. 25

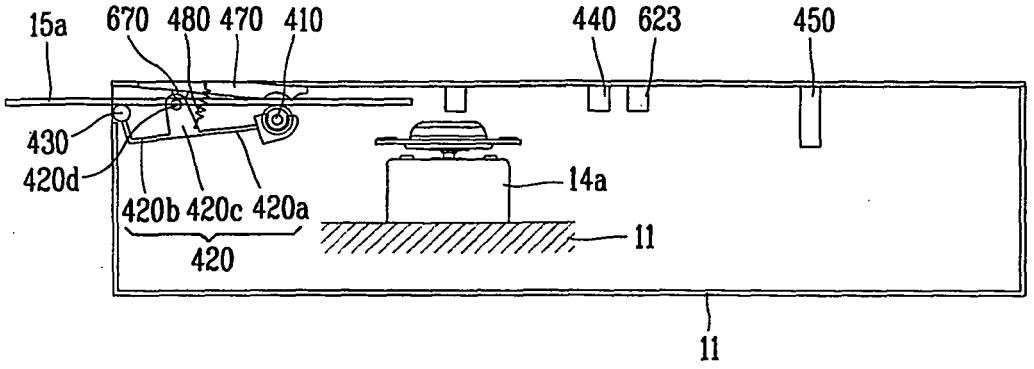


FIG. 26

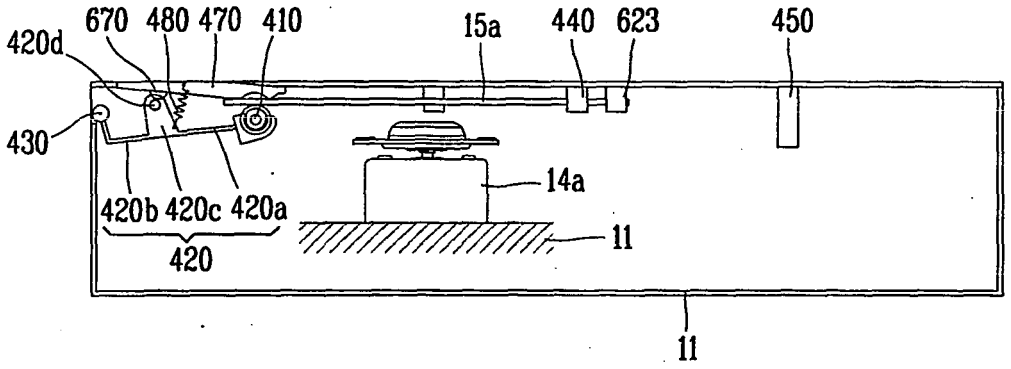


FIG. 27

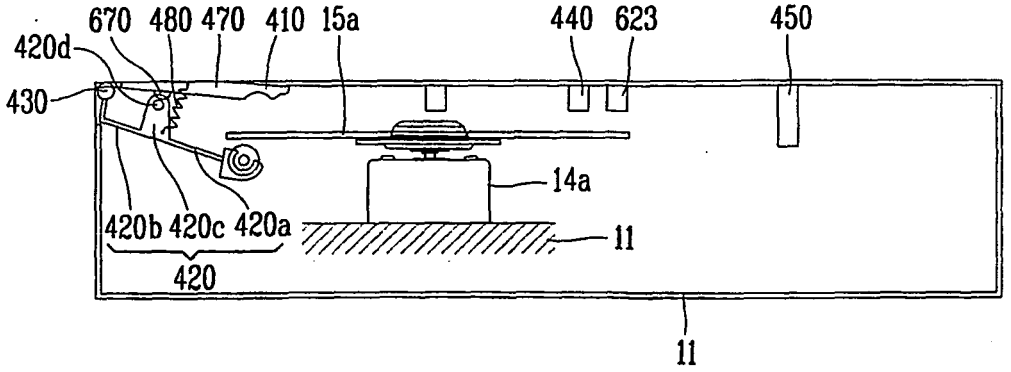


FIG. 28

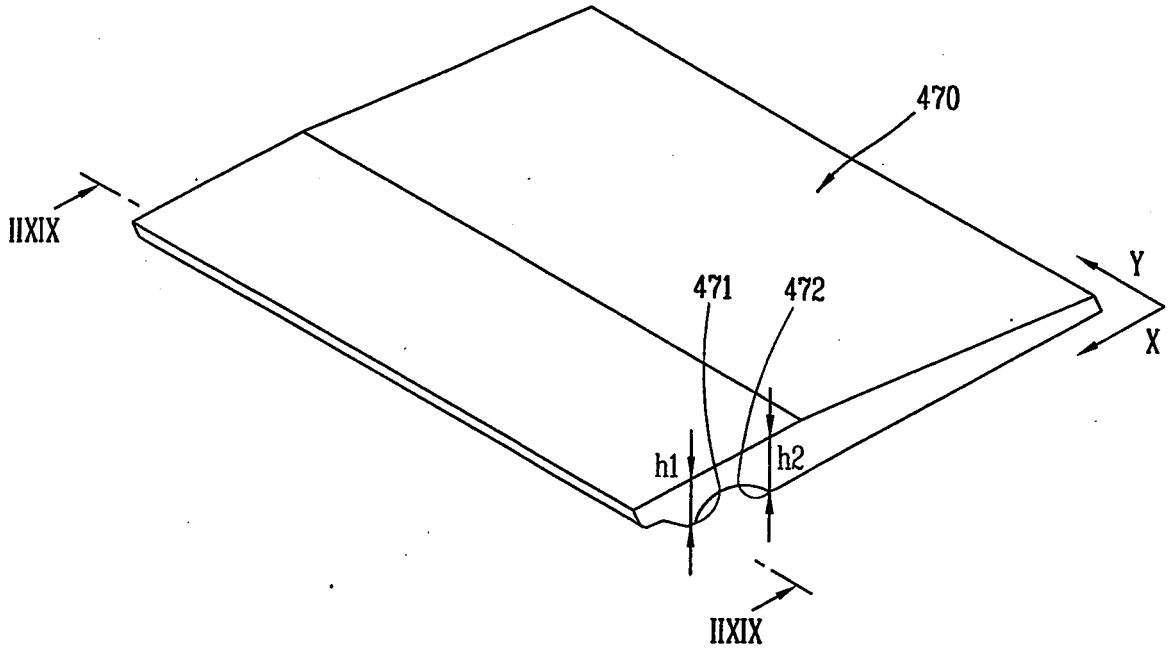


FIG. 29

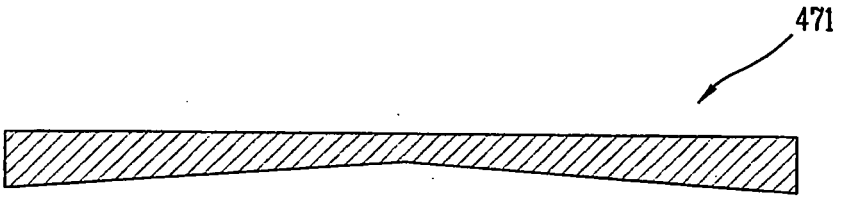


FIG. 30

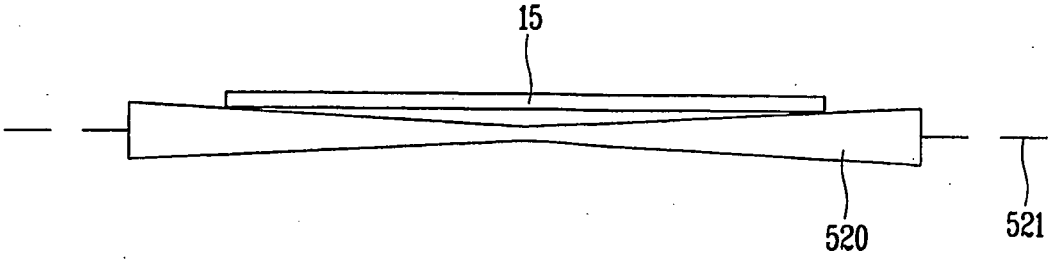
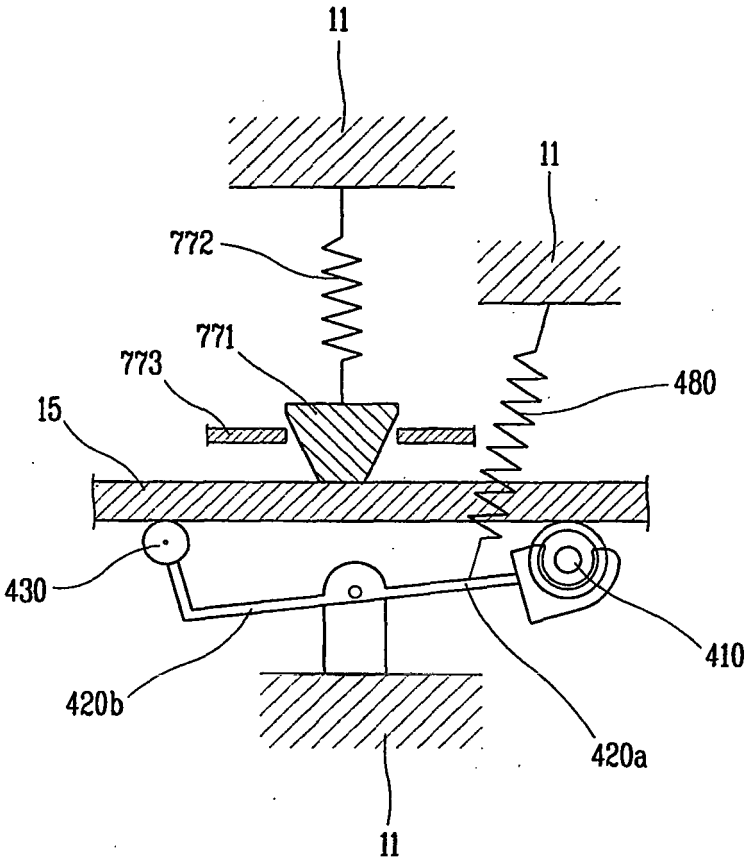


FIG. 31



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- JP 2000227417 A **[0006]**
- KR 20026312 **[0006]**